

12.4.8.5.1 Human Health—No HHRA was performed for this site because none of the COPCs exceeded risk-based concentrations for human health.

12.4.8.5.2 Ecological—The COPCs for the ERA include 2,4,6-trinitrotoluene, nitrate, and nitrite in the surface and subsurface soils. Exposure point concentrations of the contaminants of potential concern for the ERA were calculated to be 4.6 mg/kg for 2,4,6-trinitrotoluene, 210 mg/kg for nitrate, and 62.7 mg/kg for nitrite in the surface soil. These HQs and COPCs are presented in Table 12-36. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 3. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop toxicity reference values. Risks to birds and plants could not be assessed for threats from exposure to 2,4,6-TNT. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

Table 12-36. Summary of ERA HQs for the Unexploded Ordnance East of TRA.

COPCs Receptors	2,4,6-TNT HQs	Nitrate HQs	Nitrite HQs
Deer mouse	—	1	—
Loggerhead shrike	—	1	—
Pygmy rabbit	1	1	—
Sage sparrow	—	3	1
Townsend's western big-eared bat	—	3	—

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the UXO area are discussed below.

- The only HQ greater than 1 for exposure to 2,4,6-TNT was a 1 for the pygmy rabbit (M122A). The exposure point concentration in the surface soil is 4.6 mg/kg, decreasing to 0.28 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to nitrate ranged from 1 for the loggerhead shrike (AV322), pygmy rabbit (M122A), and deer mouse (M422) to 3 for the Townsend's western big-eared bat (M210A) and sage sparrow (AV222). The exposure point concentration in the surface soil is 210 mg/kg, decreasing to 73.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ greater than 1 for exposure to nitrite was a 1 for the sage sparrow (AV222). The exposure point concentration in the surface soil is 62.7 mg/kg, decreasing to 20.3 mg/kg in the subsurface soil. The INEEL background value for nitrite has been neither evaluated nor made available at this time. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the UXO east of the TRA has limited risk to ecological receptors from exposure to soils from this area. The risk from UXO to ecological receptors is considered low. Complete ERA results are presented in Appendix F.

12.4.9 Rail Car Explosion Area

12.4.9.1 Site Description. The site is approximately 3.2 km (2 mi) due west of Mile Marker 13 on Lincoln Boulevard and is adjacent to the Big Lost River channel, approximately 4.8 km (3 mi) northeast of NRF, as shown in Figure 12-10. It encompasses 195 ha (483 acres) and represents the debris scattered from a sympathetic detonation test involving five railroad cars, each loaded with 13,608 kg (30,000 lb) of explosive ordnance for a total of 68,040 kg (150,000 lb). The crater is located near the west bank of the Big Lost River, and pieces of ordnance and pieces of explosives (mostly RDX) are located along both sides of the Big Lost River (DOE-ID 1997).

12.4.9.2 Preliminary Screening. The soil data collected from the 1999 field sampling effort were screened for COPCs. The results of that screen are presented in Table 12-27. The HHRA and ERA screening methodology are discussed in Section 4 and presented in detail in Appendices D and F, respectively. No COPCs were retained for the HHRA. Nitrite was retained as a COPC for the ERA because an EBSL has not yet been established for this contaminant. 2,6-dinitrotoluene, nickel, nitrate selenium, and thallium were also retained as COPCs for the ERA because the maximum concentrations exceeded the EBSLs.

12.4.9.3 Nature and Extent of Contamination. The Rail Car soils site was considered to represent five separate areas of contamination. Area 1 is a geographical area that was not cleared in the 1996 removal action. Because it still contained UXO, it was not sampled in 1999.

Maximum detected contamination levels are listed below for all COPCs. All contamination occurs at 0 to 0.61 m (0 to 2 ft) bgs.

Area 1

• 2,6-Dinitrotoluene	3.80E+00 mg/kg
• Nickel	3.54E+01 mg/kg
• Nitrate	2.60E+02 mg/kg
• Nitrite	4.40E+01 mg/kg
• Selenium	6.80E-01 mg/kg
• Thallium	6.90E-01 mg/kg

Area 2

• Nitrate	3.80E+02
• Nitrite	5.70E+01

Area 3

• 2,6-Dinitrotoluene	3.80E+00
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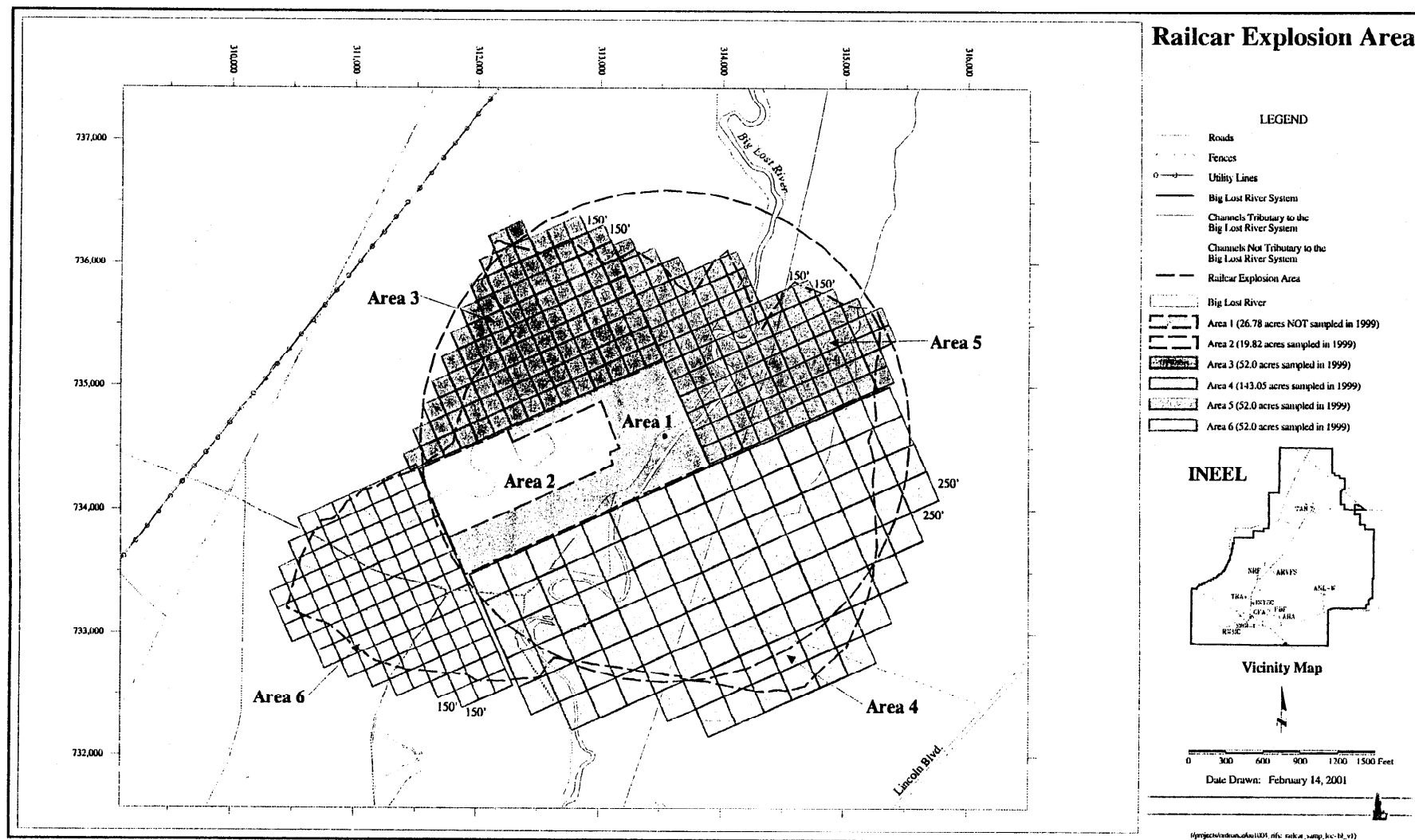


Figure 12-10. Location of Rail Car Explosion Area.

Table 12-37. Soil contaminant screening process for OU 10-04, Railcar Soils (1999).

Detected Contaminants	Step 1			Step 2	Step 3		Step 4		Site COPC	
	Max. Source Concentration (mg/kg)	INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max. Concentration > EBSL	HHRA	ERA
<u>Area 2</u>										
Nickel	3.54E+01	3.50E+01	Yes	No	1.56E+03	No	3.00E+01	Yes	No	Yes
Nitrate	2.60E+02	NA	NA	No	1.25E+05	No	1.84E+01	Yes	No	Yes
Nitrite	4.40E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No	Yes
Selenium	6.80E-01	2.20E-01	Yes	No	3.91E+02	No	1.72E-01	Yes	No	Yes
Thallium	6.90E-01	4.30E-01	Yes	No	5.48E+00	No	1.01E-01	Yes	No	Yes
<u>Area 3</u>										
Nitrate	3.80E+02	NA	NA	No	1.25E+05	No	1.84E+01	Yes	No	Yes
Nitrite	5.70E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No	Yes
<u>Area 4</u>										
2,6-Dinitrotoluene	3.80E+00	NA	NA	No	6.11E+01	No	2.18E+00	Yes	No	Yes
<u>Area 5</u>										
Nitrate	2.40E+02	NA	NA	No	1.25E+05	No	1.84E+01	Yes	No	Yes
Nitrite	4.60E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No	Yes
<u>Area 6</u>										
Nitrate	2.60E+02	NA	NA	No	1.25E+05	No	1.84E+01	Yes	No	Yes
Nitrite	5.60E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No	Yes

Source: WAG 10, OU 10-04 Database.

"NA" in Step 1 indicates that a background value is not available.

"No RBC" indicates that an EPA Region 9 or 3 RBC based on residential soil ingestion is not available.

"No EBSL" indicates that an INEEL ecologically based screening level is not available.

Arsenic was removed from the ERA and HHRA COPC lists (see discussion in Appendix K).

Area 4

- Nitrate 2.40E+02
- Nitrite 4.60E+01

Area 5

- Nitrate 2.60E+02
- Nitrite 5.60E+01.

12.4.9.3.1 Human Health—Summary statistics are presented in Appendix C. Arsenic was eliminated as a COPC because the detected levels were comparable to background. No HHRA was preformed for this site.

12.4.9.3.2 Ecological—In order to better characterize the Rail Car Explosion area and because this site covers such a large area, it was divided into five separate areas. This was also done to help keep the contaminants limited to the area in which they were found. Then, if remediation is needed, it will be limited to the contaminated area, and less of the habitat will be destroyed. The COPCs for the ERA include several inorganic and explosive compounds for the surface and subsurface soils. Table 1238 presents the exposure point concentrations. The summary statistics and exposure point concentrations are documented in Appendix C. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables 12-39 through 12-42. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 5. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop toxicity reference values (the contaminants are discussed in greater detail below and may contain a few more data gaps because of the lack of toxicity data, so will be discussed more quantitatively). Also, a few of the COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These COPCs will be discussed in greater detail under their designated area.

Area 2

HQs for the COPCs from this area ranged from 1 to 4. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

Table 12-39. Summary of ERA HQs for the Rail Car Explosion Area 2.

COPCs Receptors	Nitrate HQs	Thallium HQs
Deer mouse	2	—
Loggerhead shrike	2	—
Pygmy rabbit	2	—
Sage sparrow	4	2
Townsend's western big-eared bat	3	3
COPCs with HQs less than one are not presented in this table		

The HQs for the COPCs at the Rail Car Explosion Area 2 are discussed below:

- Nickel HQs at the rail car explosion area were all below 1.0.
- The HQs for exposure to nitrate ranged from 2 for the black-billed magpie (AV422), pygmy rabbit (M122A), and deer mouse (M422) to 3 for the Townsend's western big-eared bat (M210A) and loggerhead shrike (AV322) to 4 for the sage sparrow (AV222) and mourning dove (AV122). The EPC in the surface soil is 260 mg/kg, decreasing to 79.5 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the rail car explosion area were all below 1.0. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrite could not be developed because of the lack of toxicity data.
- Selenium HQs at the rail car explosion area were all below 1.0.
- The HQs for exposure to thallium ranged from 2 for the sage sparrow (AV222) to 3 for the Townsend's western big-eared bat (M210A). The exposure point concentration in the surface soil is 0.54 mg/kg, decreasing to 0.27 mg/kg in the subsurface soil. The INEEL 95% UTL background concentration for thallium is 0.43 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Rail Car Explosion Area 2 has limited risk to ecological receptors from exposure to soils. No COPCs were retained for further evaluation in the ERA for this area.

Table 12-40. Summary of ERA HQs for the Rail Car Explosion Area 3.

COPC Receptors	Nitrate HQs
Black-billed magpie	3
Burrowing owl	1
Deer mouse	2
Loggerhead shrike	4
Mourning dove	5
Pygmy rabbit	2
Sage sparrow	5
Townsend's western big-eared bat	4

COPCs with HQs less than one are not presented in this table.

Area 3

HQs for the COPCs from this area ranged from 1 to 5. The risk to plants could not be assessed for nitrate and nitrite.

The HQs for the COPCs at the Rail Car Explosion Area 3 are discussed below:

- The HQs for exposure to nitrate ranged from 1 for the burrowing owl (AV322A) to 2 for the pygmy rabbit (M122A) and deer mouse (M422) to 3 for the black-billed magpie (AV422) to 4 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A) to 5 for the mourning dove (AV122) and sage sparrow (AV222). The exposure point concentration in the surface soil is 346 mg/kg, decreasing to 90.8 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nitrite HQs at the Rail Car Explosion Area were all below 1.0. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrite could not be developed because of the lack of toxicity data.

The risk evaluation indicates that the Rail Car Explosion Area 3 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 3.

Area 4

Hazard quotients for the COPCs from this area were all below 1. Risks to birds and plants could not be assessed for threats from exposure to 2,6-dinitrotoluene. The HQs for the COPCs at the Rail Car Explosion Area 4 are discussed below:

- 2,6-dinitrotoluene HQs at the rail car explosion area were all below 1.0.

The risk evaluation indicates that the Rail Car Explosion Area 4 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 4.

Area 5

Hazard quotients for the COPCs from this study area ranged from 1 to 3. Risk to plants from nitrate could not be assessed.

The HQs for the COPCs at the Rail Car Explosion Area 5 are discussed below:

- The HQs for exposure to nitrate ranged from 1 for the pygmy rabbit (M122A) and deer mouse (M422) to 2 for the black-billed magpie (AV422) to 3 for the loggerhead shrike (AV322), Townsend's western big-eared bat (M210A), mourning dove (AV122), and sage sparrow (AV222). The EPC in the surface soil is 206 mg/kg, decreasing to 73.3 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

Table 12-41. Summary of ERA HQs for the Rail Car Explosion Area 5.

COPC Receptors	Nitrate HQs
Black-billed magpie	2
Deer mouse	1
Loggerhead shrike	3
Mourning dove	3
Pygmy rabbit	1
Sage sparrow	3
<u>Townsend's western big-eared bat</u>	3

COPCs with HQs less than one are not presented in this table.

- Nitrite HQs at the rail car explosion area were all below 1.0. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrate could not be developed because of the lack of toxicity data.

The risk evaluation indicates that the Rail Car Explosion Area 5 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 5.

Area 6

Hazard quotients for the COPCs from this study area ranged from 1 to 4. Risk to plants could not be assessed for nitrate and nitrite.

Table 12-42. Summary of ERA HQs for the Rail Car Explosion Area 6.

COPCs Receptors	Nitrate HQs	Nitrite HQs
Black-billed magpie	2	—
Deer mouse	2	—
Loggerhead shrike	3	1
Mourning dove	4	1
Pygmy rabbit	2	—
Sage sparrow	4	2
<u>Townsend's western big-eared bat</u>	3	1

COPCs with HQs less than one are not presented in this table.

The HQs for the COPCs at the Rail Car Explosion Area 6 are discussed below:

- The HQs for exposure to nitrate ranged from 2 for the pygmy rabbit (M122A), deer mouse (M422), and black-billed magpie (AV422) to 3 for the loggerhead shrike (AV322) and Townsend's western big-eared bat (M210A) to 4 for the mourning dove (AV122) and sage sparrow (AV222). The EPC in the surface soil is 260 mg/kg, decreasing to 76 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to nitrite ranged from 1 for the mourning dove (AV122), loggerhead shrike (AV322), and the Townsend's western big-eared bat (M210A) to 2 for the sage sparrow (AV222). The EPC in the surface soil is 110 mg/kg, decreasing to 96 mg/kg in the subsurface soil. The INEEL background value for sulfate has been neither evaluated nor made available at this time. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that the Rail Car Explosion Area 6 has limited risk to ecological receptors from exposure to soils from this area. No COPCs were retained for further evaluation in the ERA for Rail Car Explosion Area 6.

In summary, based on dose and HQ calculations and background comparisons, there are no potential risk-drivers at the Rail Car Explosion Area. The risk from unexploded ordnance to ecological receptors is considered low. Complete ERA results are presented in Appendix F.

12.4.10 Craters East of INTEC

12.4.10.1 Site Description. The site encompasses 69 ha (171 acres) and includes three small craters located approximately 0.8 km (0.5 mi) southeast of the INTEC, primarily adjacent to and approximately 91.4 m (100 yd) west of the Anaconda Power Line Road, and extending westward toward the railroad tracks, as shown in Figure 12-11. The area adjacent to and surrounding the craters is littered with widely scattered debris and pieces of explosives resulting from explosives tests or associated cleanup detonations. This area is within the impact zone of "extreme elevation" antiaircraft proof firings from the Naval Proving Ground gun emplacements. Only 3-in. and 5-in. (7-cm and 13-cm) inert projectiles have been found in the downrange impact area (DOE-ID 1997).

12.4.10.2 Previous Investigations. During the 1996 Track 2 field assessment, a 0.4-ha (10-acre) area was identified as requiring surface clearance of widely scattered pieces of explosives (TNT). No UXO was found in 1996 near the craters, but the potential existed for subsurface UXO (DOE-ID 1997).

In 1997, the field team cleared the surface and subsurface of this site, which included a total of 7.17 ha (17.72 acres), of UXO and exploded ordnance waste from June 12 to June 25. Only the areas contained within the craters were subsurface-cleared for UXO. The craters were excavated to a minimum depth of 0.61 m (2 ft). The excavation included the walls of the craters laterally (0.61 m [2 ft]) and down 0.61 m (2 ft) beginning at the bottom of the crater. All anomalies detected by the magnetometer were excavated and investigated, regardless of depth; however, practice has shown that most fragmentation is limited to within the first 0.61 m (2 ft). An additional 3.12 surface ha (7.72 acres) over the original scope

of 4 ha (10 acres) were cleared of scattered pieces of exploded ordnance waste to more completely remediate this site (DOE-ID 1997).

12.4.10.3 Preliminary Screening. The soil data collected from the 1999 field sampling effort were screened for COPCs. The results of that screening are presented in Table 12-44. The HHRA and ERA screening methodology are discussed in Section 4 and presented in detail in Appendices D and F, respectively. No COPCs were retained for the HHRA. Nitrite was retained as a COPC for the ERA because the EBSL has not yet been established for this contaminant. Nitrate and selenium were also retained as COPCs for the ERA because the maximum concentrations exceeded the EBSLs.

12.4.10.4 Risk Assessment. Appendix C contains both the summary statistics and exposure point concentrations supporting this assessment.

12.4.10.4.1 Human Health—No HHRA was preformed for this site.

12.4.10.4.2 Ecological—The COPCs for the ERA include nitrate, nitrite, and selenium. The exposure point concentrations used in the ERA and as presented in Appendix C are nitrate (1.04E to 2 mg/kg), nitrite (3.15E+01), and selenium (3.36E-01). Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Table 12-44. COPCs with HQs less than or equal to 10 are eliminated from the ERA because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs from the contaminants at this site ranged from 1 to 4. Risks from the COPCs to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop toxicity reference values. Furthermore, risk to plants could not be assessed for nitrate and nitrite.

The HQs for the COPCs at the craters east of INTEC are discussed below.

- The HQs for exposure to nitrate ranged from 1 for the black-billed magpie (AV422) to 2 for the pygmy rabbit (M122A) and deer mouse (M422) to 3 for the mourning dove (AV122), loggerhead shrike (AV322), and Townsend’s western big-eared bat (M210A) to 4 for the sage sparrow (AV222). The exposure point concentration in the surface soil is 260 mg/kg, decreasing to 104 mg/kg in the subsurface soil. The INEEL background value for nitrate has been neither evaluated nor made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

Table 12-43. Summary of ERA HQs for the Craters East of INTEC.

COPCs Receptors	Nitrate HQs	Nitrite HQs	Selenium HQs
Black-billed magpie	1	—	—
Deer mouse	2	—	—
<u>Loggerhead shrike</u>	3	—	—
Mourning dove	3	—	—
Pygmy rabbit	2	—	—
Sage sparrow	4	1	2
Townsend’s western big-eared bat	3	1	2

COPCs with HQs less than one are not presented in this table.

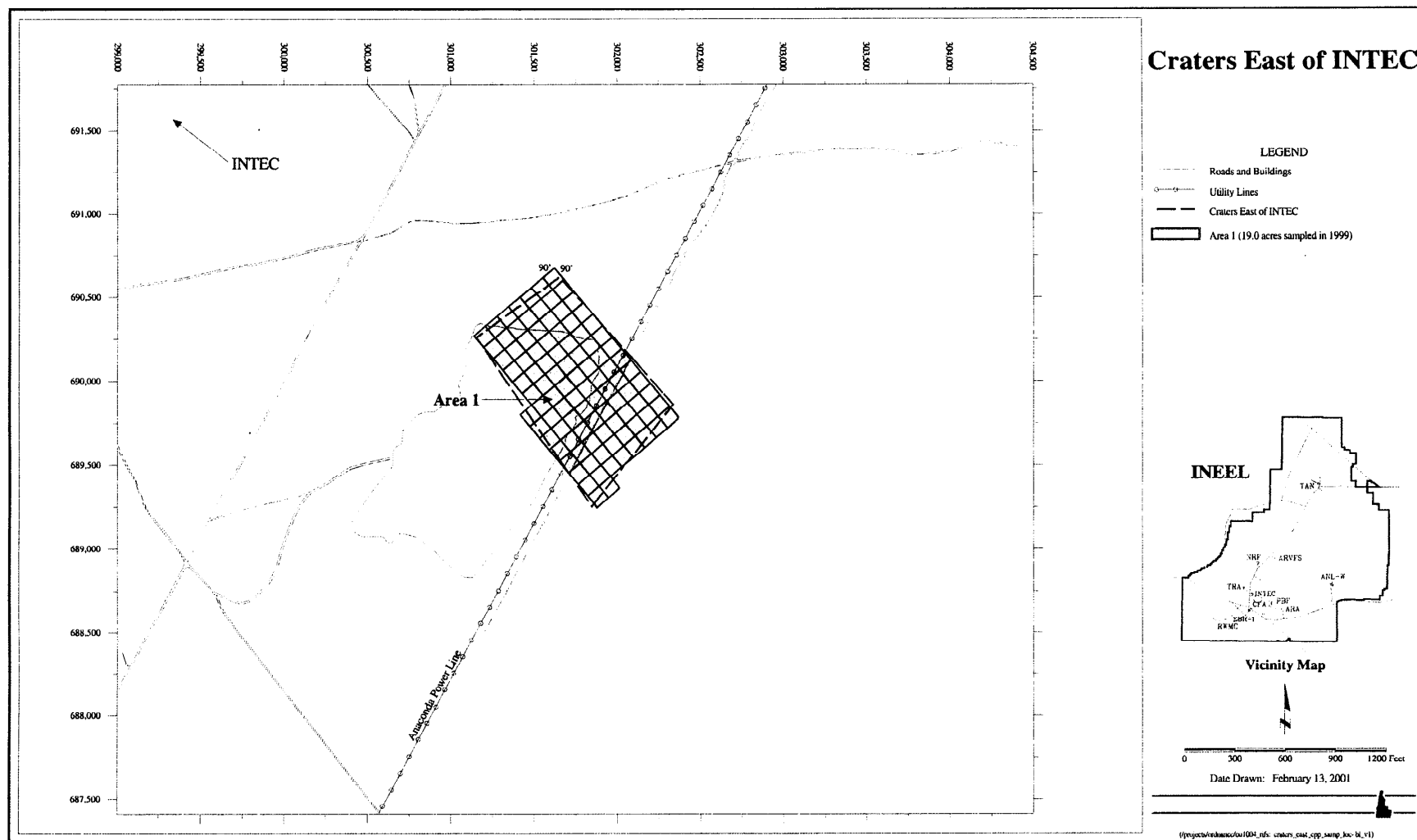


Figure 12-11. Location of Craters East of INTEC.

- The only HQ greater than 1 for exposure to nitrite was a 1 for the sage sparrow (AV222) and Townsend's western big-eared bat (M210A). The exposure point concentration in the surface soil is 76.8 mg/kg, decreasing to 31.5 mg/kg in the subsurface soil. The INEEL background value for nitrite has been neither evaluated nor made available at this time. Toxicity reference values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. Toxicity reference values for nitrite could not be developed because of the lack of toxicity data. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ greater than 1 for exposure to selenium was a 2 for the Townsend's western big-eared bat (M210A) and sage sparrow (AV222). The exposure point concentration in the surface soil is 0.9 mg/kg, decreasing to 0.34 mg/kg in the subsurface soil. The INEEL background concentration for selenium is 0.22 mg/kg. This contaminant was eliminated as a COPC because the HQ fell below 10, which indicates a low risk to ecological receptors.

In summary, based on dose and HQ calculations and background comparisons, there are no potential risk-drivers at the Craters East of INTEC. The risk from UXO to ecological receptors is considered low. Complete ERA results are presented in Appendix F.

12.4.11 Naval Ordnance Disposal Area

12.4.11.1 Site Description. The NODA site is located approximately 1.6 km (1 mi) northeast of U.S. Highway 20/26 between Mile Markers 266 and 267 and about 3.2 km (2 mi) equidistant from the TRA, INTEC, and CFA facilities at the INEEL, as shown in Figure 12-12. NODA is reported to have been used as an ordnance and nonradioactive hazardous material disposal area by the U.S. Navy during the 1940s. Following the establishment of the National Reactor Testing Station (now the INEEL), the NODA came under the control of a prime contractor for the AEC (now DOE). From about 1967 to 1985, the prime contractor treated (burned) approximately 3,175 kg (7,000 lb) of reactive materials at the NODA. Between 1967 and 1985, the NODA was also used as a storage area for hazardous waste generated at the INEEL. Until 1982, solvents, corrosives, ignitables, heavy metal contaminated solutions, formaldehyde, polychlorinated biphenyl materials, waste laboratory chemicals, and reactives were stored at this site. As of October 1985, all these materials have been removed for off-Site disposal as hazardous waste or treated on-Site by open burning, as allowed by RCRA regulations (DOE-ID 1997).

The 1994 removal action defined the cleanup area as 16 ha (40 acres) in size and centered approximately 762 m (2,500 ft) north of the current INEEL security force gun range on Portland Avenue. The total area of the site is estimated to be 56 ha (138 acres) (see map in Appendix H, DOE-ID 1997).

During the 1996 field assessment, the area outside the site was cleared during the 1994 and 1995 removal actions and was searched on foot by field crews using approximately 10-m (32.8-ft) spacing beginning at the west boundary. This search was continued outward, until the last piece of fragmentation was found. All four sides of the original removal action site were assessed. Multiple types of UXO were recovered from this site (DOE-ID 1997).

During the 1996 field assessment, seven live 12.7-cm (5-in.) projectiles and one split-open 12.7-cm (5-in.) projectile with a live fuze were found. Scattered TNT and RDX were found on the south side and southeast corner of the area. What appears to have been a munitions burn facility (crumbled concrete box) was found just west of the Big Lost River. No ordnance or ordnance waste was found at this site; however, what appears to have been fuel-stained soil was observed on the berm on which this facility was constructed (DOE-ID 1997).

In 1999, surface soil samples were collected as described in the *Field Sampling Plan (FSP) for Operable Unit (OU) 10-04 Explosive Compounds* (DOE-ID 1999b).

Table 12-44. Soil contaminant screening process for OU 10-04, Crater East of INTEC Soils.

	Step 1		Step 2		Step 3		Step 4		Site COPC	
Detected Contaminants	Max. Source Concentration (mg/kg)	INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max. Concentration > EBSL	HHRA	ERA
Nitrate	2.60E+02	NA	NA	No	1.25E+05	No	1.84E+01	Yes	No	Yes
Nitrite	9.80E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No	Yes
Selenium	1.20E+00	2.20E-01	Yes	No	3.91E+02	No	1.72E-01	Yes	No	Yes

Source: WAG 10, OU 10-04 Database.

"NA" in Step 1 indicates that a background value is not available.

"No RBC" indicates that an EPA Region 9 or 3 RBC based on residential soil ingestion is not available.

"No EBSL" indicates that an INEEL ecologically based screening level is not available.

Arsenic was removed from the ERA and HHRA COPC lists (see discussion in Appendix K).

12.4.11.2 Preliminary Screening. The soil data collected from the 1997, 1999, and 2000 field sampling efforts were screened for COPCs. The results of that screen are presented in Table 12-45. The HHRA and ERA screening methodology are discussed in Section 4 and presented in detail in Appendices D and F, respectively.

12.4.11.3 Nature and Extent of Contamination. The NODA soils site was considered to represent three separate areas of contamination.

Maximum detected contamination levels are listed below for all HHRA and ERA COPCs. All contamination occurs at 0 to 0.61 m (0 to 2 ft) bgs.

Area 2:

• 1,3,5-Trinitrobenzene	2.70E+00 mg/kg
• 1,3-Dinitrobenzene	2.48E-01 mg/kg
• 2,4,6-TNT	1.00E+02 mg/kg
• 2-Amino-4,6-Dinitrotoluene	2.47E+00 mg/kg
• 2-Hexanone	5.00E-03 mg/kg
• 2-Methylnaphthalene	3.80E-02 mg/kg
• 2-Pentanone	5.10E+01 mg/kg
• 4-Amino-2,6-Dinitrotoluene	3.33E+00 mg/kg
• 4-Chloro-3-Methylphenol	6.00E-02 mg/kg
• 4-Methyl-2-Pentanone	5.00E-03 mg/kg
• 4-Nitrophenol	3.50E-01 mg/kg
• Antimony	5.16E+01 mg/kg
• Barium	1.74E+03 mg/kg
• Benzo(g,h,i)perylene	1.70E-01 mg/kg
• Boron	1.03E+03 mg/kg
• Cadmium	1.33E+01 mg/kg
• Chlorobenzene	6.70E-02 mg/kg
• Chromium	6.76E+01 mg/kg
• Cobalt	1.71E+01 mg/kg
• Copper	2.40E+04 mg/kg
• HMX	1.10E+00 mg/kg
• Lead	1.79E+03 mg/kg
• Manganese	1.29E+03 mg/kg
• Mercury	2.40E+00 mg/kg
• Nickel	3.72E+02 mg/kg
• Nitrate	5.46E+02 mg/kg
• Nitrite	5.60E+01 mg/kg
• Pentachlorophenol	3.20E-01 mg/kg
• Picric Acid	1.16E+00 mg/kg
• RDX	3.28E+02 mg/kg
• Silver	1.10E+01 mg/kg
• Strontium	8.18E+01 mg/kg
• Tetryl	1.39E+01 mg/kg
• Thorium	2.68E+01 mg/kg
• Total Phosphorus	6.32E+01 mg/kg
• Vanadium	6.07E+01 mg/kg
• Zinc	3.62E+02 mg/kg.

Table 12-45. Soil contaminant screening process for OU 10-04, NODA Soils (1997, 1999, 2000).

Detected Contaminants	Max. Source Concentration (mg/kg)	Step 1		Step 2	Step 3	Step 4			Site COPC	
		INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max Concentration > EBSL	HHRA	ERA
<u>Area 2</u>										
1,3,5-Trinitrobenzene	2.70E+00	NA	NA	No	1.83E+03	No	No EBSL	No EBSL	No	Yes
1,3-Dinitrobenzene	2.48E-01	NA	NA	No	6.11E+00	No	7.82E-02	Yes	No	Yes
2,4,6-TNT	1.00E+02	NA	NA	No	1.62E+01	Yes	No EBSL	No EBSL	Yes	Yes
2-Amino-4,6-Dinitrotoluene	2.47E+00	NA	NA	No	4.70E+00	No	No EBSL	No EBSL	No	Yes
2-Hexanone	5.00E-03	NA	NA	No	3.13E+03	No	No EBSL	No EBSL	No	Yes
2-Methylnaphthalene	3.80E-02	NA	NA	No	1.56E+03	No	No EBSL	No EBSL	No	Yes
2-Pentanone	5.10E+01	NA	NA	No	No RBC	No RBC	No EBSL	No EBSL	Yes	Yes
4-Amino-2,6-Dinitrotoluene	3.33E+00	NA	NA	No	4.70E+00	No	No EBSL	No EBSL	No	Yes
4-Chloro-3-methylphenol	6.00E-02	NA	NA	No	No RBC	No RBC	1.80E+01	No	Yes	No
4-Methyl-2-Pentanone	5.00E-03	NA	NA	No	6.30E+03	No	No EBSL	No EBSL	No	Yes
4-Nitrophenol	3.50E-01	NA	NA	No	4.89E+02	No	No EBSL	No EBSL	No	Yes
Antimony	5.16E+01	4.80E+00	Yes	No	3.13E+01	Yes	1.35E+00	Yes	Yes	Yes
Barium	1.74E+03	3.00E+02	Yes	No	5.48E+03	No	1.10E+01	Yes	No	Yes
Benzo(g,h,i)perylene	1.70E-01	NA	NA	No	No RBC	No RBC	2.69E+00	No EBSL	Yes	No
Cadmium	1.33E+01	2.20E+00	Yes	No	3.70E+01	No	2.36E-03	Yes	No	Yes
Chlorobenzene	6.70E-02	NA	NA	No	1.52E+02	No	No EBSL	No EBSL	No	Yes
Chromium	6.76E+01	3.30E+01	Yes	No	2.10E+02	No	1.00E+00	Yes	No	Yes
Cobalt	1.71E+01	1.10E+01	Yes	No	4.69E+03	No	4.27E-01	Yes	No	Yes

Table 12-45. (continued).

	Detected Contaminants	Max. Source Concentration (mg/kg)	Step 1		Step 2	Step 3	Step 4		Site COPC	
			INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max Concentration > EBSL	HHRA ERA
12-83	Copper	2.40E+04	2.20E+01	Yes	No	2.90E+03	Yes	2.11E+00	Yes	Yes
	Decane, 3,4-Dimethyl	6.00E-03	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^a Yes
	HMX	1.10E+00	NA	NA	No	3.06E+03	No	No EBSL	No EBSL	No Yes
	Lead	1.79E+03	1.70E+01	Yes	No	4.00E+02	Yes	9.94E-01	Yes	Yes
	Manganese	1.29E+03	4.90E+02	Yes	No	1.60E+03	No	1.05E+01	Yes	No Yes
	Mercury	2.40E+00	5.00E-02	Yes	No	6.10E+00	No	3.00E-01	Yes	No Yes
	Nickel	3.72E+02	3.50E+01	Yes	No	1.56E+03	No	3.00E+01	Yes	No Yes
	Nitrate/Nitrite-N	5.46E+02	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No Yes
	Nitrite	5.60E+01	NA	NA	No	7.82E+03	No	No EBSL	No EBSL	No Yes
	Octane,2,3,7-Trimethyl	6.00E-03	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^a Yes
	Pentachlorophenol	3.20E-01	NA	NA	No	2.98E+00	No	1.30E-01	Yes	No Yes
	Picric Acid	1.16E+00	NA	NA	No	8.10E+02	No	No EBSL	No EBSL	No Yes
	RDX	3.28E+02	NA	NA	No	4.42E+00	Yes	No EBSL	No EBSL	Yes Yes
	Silver	1.10E+01	NA	NA	No	3.91E+02	No	2.00E+00	Yes	No Yes
	Strontium	8.18E+01	NA	NA	No	4.69E+04	No	5.91E+00	Yes	No Yes
	Tetryl	1.39E+01	NA	NA	No	7.82E+02	No	No EBSL	No EBSL	No Yes
	Thallium	2.68E+01	NA	NA	No	2.10E+01	Yes	No EBSL	No EBSL	Yes Yes
	Total Phosphorus	6.32E+01	NA	NA	No	1.56E+00	Yes	No EBSL	No EBSL	No ^b Yes
	Undecane,4,6-Dimethyl	6.00E-03	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^a Yes
	Vanadium	6.07E+01	4.50E+01	Yes	No	5.48E+02	No	1.49E+00	Yes	No Yes

Table 12-45. (continued).

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		Step 1			Step 2	Step 3	Step 4			Site COPC	
	Detected Contaminants	Max. Source Concentration (mg/kg)	INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max Concentration > EBSL	HHRA	ERA
	Zinc	3.62E+02	1.50E+02	Yes	No	2.35E+04	No	3.29E+00	Yes	No	Yes
	<u>Area 3</u>										
	2-Hexanone	4.10E-02	NA	NA	No	3.13E+03	No	No EBSL	No EBSL	No	Yes
	2-Pentanone	4.86E+01	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	Yes ^c	Yes
	Aroclor-1268	1.23E+00	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^c	Yes
	Barium	1.14E+03	3.00E+02	Yes	No	5.48E+03	No	1.10E+01	Yes	No	Yes
	bis(2-Ethylhexyl) phthalate	1.50E+00	NA	NA	No	3.50E+01	No	No EBSL	No EBSL	No	Yes
	Chromium	3.68E+01	3.30E+01	Yes	No	2.10E+02	No	1.00E+00	Yes	No	Yes
	Cobalt	1.39E+01	1.10E+01	Yes	No	4.69E+03	No	4.27E-01	Yes	No	Yes
	Copper	3.83E+01	2.20E+01	Yes	No	2.90E+03	No	2.11E+00	Yes	No	Yes
	Lead	2.36E+01	1.70E+01	Yes	No	4.00E+02	No	9.94E-01	Yes	No	Yes
	Manganese	6.77E+02	4.90E+02	Yes	No	1.60E+03	No	1.05E+01	Yes	No	Yes
	Nickel	5.96E+01	3.50E+01	Yes	No	1.56E+03	No	3.00E+01	Yes	No	Yes
	Vanadium	4.67E+01	4.50E+01	Yes	No	5.48E+02	No	1.49E+00	Yes	No	Yes
	Zinc	2.61E+02	1.50E+02	Yes	No	2.35E+04	No	3.29E+00	Yes	No	Yes
	<u>Area 4</u>										
	Benzo(a)pyrene	1.00E+00	NA	NA	No	6.20E-02	Yes	2.69E+00	No	Yes	No
	Chrysene	7.80E-01	NA	NA	No	6.20E+01	No	No EBSL	No EBSL	No	Yes
	Gasoline Range C7-C12 Idaho	2.00E-04	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^d	Yes
	Heneicosane, 11- (1-Ethylprop)	1.49E-02	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	No ^d	Yes

Table 12-45. (continued).

Detected Contaminants									Site COPC	
	Step 1			Step 2	Step 3	Step 4				
	Max. Source Concentration (mg/kg)	INEEL Background Concentration (mg/kg)	Max. Concentration > Background	Nontoxic Metal	Region 9/3 RBC (mg/kg)	Max. Concentration > RBC	INEEL EBSL (mg/kg)	Max Concentration > EBSL	HHRA	ERA
Manganese	5.55E+02	4.90E+02	Yes	No	1.60E+03	No	1.05E+01	Yes	No	Yes
Methapyrilene	1.70E+00	NA	NA	No	NO RBC	No RBC	No EBSL	No EBSL	Yes	Yes
Phenanthrene	3.30E-01	NA	NA	No	NO RBC	No RBC	1.35E+02	No	Yes	No
Selenium	1.00E+00	2.20E-01	Yes	No	3.91E+02	No	1.72E-01	Yes	No	Yes
TPH-diesel	1.20E+03	NA	NA	No	1.00E+03	Yes	No EBSL	No EBSL	Yes	Yes

Source: WAG 10, OU 10-04 Database.

"NA" in Step 1 indicates that a background value is not available.

"No RBC" indicates that an EPA Region 9 or 3 RBC based on residential soil ingestion is not available.

"No EBSL" indicates that an INEEL ecologically based screening level is not available.

a. The EBSL for Benzo (a) pyrene was used for Benzo (g, h, i) perylene because of their similar properties and for the lack of information needed to create an EBSL for Benzo (g, h, i) perylene.

b. The EBSL for Benzo (a) pyrene was also used to evaluate chrysene because of their similar properties, and for a lack of information needed to create an EBSL for chrysene.

Arsenic was removed from the ERA and HHRA COPC lists because detected levels are within the arsenic regional background ranges discussed in Appendix K. Fluoride was removed from the ERA COPC list since the maximum concentration was within the background levels (see Appendix F).

Sulfate was removed from the ERA and HHRA COPC lists because this compound is essential for all receptors and is not considered toxic at extremely high concentration (Bodek et al. 1988). See Appendix F. The following chemicals were removed from the HHRA COPC list since the maximum concentrations were all 0.006 mg/kg and had only one sample: Decane, 3,4-Dimethyl, Octain, 2,3,7-Trimethyl, Undecane, 4,6-Dimethyl-. These COPCs are types of hydrocarbons and would have undergone considerable attenuation since being sampled in 1993.

Aroclor-1268 was removed from the HHRA COPC list because sample results were identified as Matrix Spikes.

Gasoline Range C7-C12 Idaho was removed from the HHRA COPC list because the maximum concentration was extremely low, 2E-04. This COPC would have undergone some natural attenuation since being sampled in 1999. Heneicosane, 11- (1-Ethylprop, was also removed from the HHRA COPC list because the maximum concentration was only 0.01 mg/kg. This hydrocarbon would have also undergone some natural attenuation since being sampled in 1999.

Area 3:

•	2-Hexanone	4.10E-02
•	2-Pentanone	4.86E+01
•	Antimony	6.10E+00
•	Barium	1.14E+03
•	Chromium	3.68E+01
•	Cobalt	1.39E+01
•	Copper	3.83E+01
•	Lead	2.36E+01
•	Manganese	6.77E+02
•	Nickel	5.96E+01
•	Vanadium	4.67E+01
•	Zinc	2.61E+02

Area 4:

•	Benzo(a)pyrene	1.00E+00
•	Manganese	5.55E+02
•	Methapyrilene	1.70E+00
•	Phenanthrene	3.30E-01
•	Selenium	1.00E+00
•	TPH-diesel	1.20E+03

12.4.11.4 Risk Assessment. Table 12-47 presents the exposure point concentrations used in the baseline risk assessment. Appendix C contains both the summary statistics and exposure point concentrations supporting this assessment.

12.4.11.4.1 Human Health—The estimated human health risks at NODA vary by area (Table 12-46).

The total human health risk for future residents is above the 1E-04 to 1E-06 target risk range for Area 2. The primary contributor to risk for this area is ingestion of homegrown produce contaminated with RDX. The total human health risks for current and future workers are within or below the target risk range.

The total noncarcinogenic hazard to future residents is above 1 for Area 2. This hazard value is associated with ingestion of soil, groundwater, and homegrown produce contaminated with RDX. The total noncarcinogenic hazards to current and future workers are below 1 for all areas.

12.4.11.4.2 Ecological—The COPCs for the ERA include several inorganics, TPH, and explosive compounds for the surface and subsurface soils. Because this site covers such a large area and in order to better characterize the area, it was divided into three areas. This was also done to help keep the contaminants limited to the area in which they were found. Then, if remediation was needed, it would be limited to the contaminated area and less of the habitat would be destroyed. Only COPCs with HQs greater than 10 will be retained for further evaluation in the ERA. These HQs and COPCs are presented in Tables 12-47 through 12-49. COPCs with HQs less than or equal to 10 are eliminated from the ERA

Table 12-46. Human health carcinogenic risk and noncarcinogenic hazard index summary for NODA.

Area	Risk Scenario			Hazard Index Scenario		
	Residential	Current Worker	Future Worker	Residential	Current Worker	Future Worker
2	2E-02	1E-05	1E-05	2E+02	1E-01	1E-01
3	1E-02	5E-08	5E-08	1E+02	8E-02	8E-02
4	1E-02	3E-05	3E-05	1E+02	2E-05	2E-05

Source: HHRA Spreadsheets. See Appendix E.

because they pose a low risk to ecological receptors and no longer need to be evaluated. HQs for the COPCs from this site ranged from 1 to 4,000. Risks from these contaminants to reptiles, amphibians, and invertebrates could not be evaluated because of the lack of toxicity data to develop toxicity reference values (the contaminants are discussed in greater detail below and may contain a few more data gaps because of the lack of toxicity data, so will be discussed more quantitatively). Several COPCs for this site could not be assessed for ecological risk because of the lack of toxicity information. These are listed under each study area as discussed below.

Area 2

HQs for the COPCs from this area ranged from 1 to 4,000. Risks to birds and plants could not be assessed for threats from exposure to 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, 2-amino-4,6-dinitrotoluene, 2-methylnaphthalene, 2,4,6-TNT, 4-amino-2,6-dinitrotoluene, 4-methyl-2-pentanone, HMX, pentachlorophenol, RDX, strontium, and tetryl. Risk for birds could not be assessed for antimony and barium. Furthermore, risk for plants could not be assessed for cobalt, nitrate, and nitrite. Several explosive and organic contaminants were among the COPCs for this area, but no toxicity information could be found to assess ecological risk. The contaminants and concentrations are as follows: 0.0054 mg/kg (2-hexanone), 51 mg/kg (2-pentanone), 1 mg/kg (4-nitrophenol), 0.006 mg/kg (chlorobenzene), and 0.428 mg/kg (picric acid). These contaminants were considered low risk because their concentrations were found at low levels. For this reason, they are unlikely to pose significant risk to any ecological receptor and will no longer be evaluated.

The HQs for the COPCs at NODA Area 2 are discussed below.

- 1,3,5-Trinitrobenzene HQs at NODA Area 2 were all below 1.0.
- The only HQ ≥ 1 for exposure to 1,3-dinitrobenzene was a 2 for the pygmy rabbit (M122A). The EPC in the surface soil is 0.28 mg/kg decreasing to 0.16 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- 2-amino-4,6-dinitrotoluene HQs at NODA Area 2 were all below 1.0.
- 2-methylnaphthalene HQs at NODA Area 2 were all below 1.0. TRV values from benzo(a)pyrene were used to evaluate this COPC because of their similar characteristics and properties. TRV values for 2-methylnaphthalene could not be developed because of the lack of toxicity data.

Table 12-47. Summary of ERA HQs for NODA Area 2.

COPCs Receptors	1,3,5- trinitrobenzene HQs	Barium HQs	Cadmium chromium HQs	Chromium HQs	Cobalt HQs	Copper HQs	Lead HQs
Black-billed magpie	—	—	10	—	20	1	2
Burrowing owl	—	—	—	—	1	—	1
Deer mouse	—	20 ^a	400 ^a	—	4	20 ^a	—
Loggerhead shrike	—	—	20	—	5	—	5
Mourning dove	—	—	—	—	50	2	—
Mule deer	—	—	30	—	1	2	—
Plants	—	—	—	5			—
Pygmy rabbit	2	6	100 ^a	—	7	10	—
Sage sparrow	—	—	10	—	6	2	4
Townsend's western big-eared bat	—	70 ^a	50 ^a	—	1	30 ^a	—

COPCs Receptors	Manganese HQs	Mercury HQs	Nitrate HQs	Pentachlorophenol HQs	RDX HQs	Strontium HQs
Black-billed magpie	2	8	1	—	—	—
Burrowing owl	—	2	—	—	—	—
Deer mouse	6	1	1	1	2,000	2
Loggerhead shrike	—	8	2	—	—	—
Mourning dove	6	8	2	—	—	—
Mule deer	2	—	—	—	700	—
Plants	7	—	—	—	—	—
Pygmy rabbit	10	1	1	3	4,000	4
Sage sparrow	—	7	3	—	—	—
Townsend's western big-eared bat	—	1	2	—	3	—

COPCs Receptors	Vanadium HQs	Zinc HQs
Burrowing owl	—	2
Black-billed magpie	—	7
Deer mouse	3	2
Loggerhead shrike	—	6
Mourning dove	—	10
Plants	—	5
Pygmy rabbit	—	2
Sage sparrow	1	10
Townsend's western big-eared bat	10	3

COPCs with HQs less than one are not presented in this table.

a. See the bulleted discussion on barium, cadmium and copper following this table as to why these HQs are not retained in the ERA.

- 2,4,6-trinitrotoluene HQs at NODA Area 2 were all below 1.0.
- 4-amino-2,6-dinitrotoluene HQs at NODA Area 2 were all below 1.0.
- 4-methyl-2-pentanone HQs at NODA Area 2 were all below 1.0.
- Antimony HQs at NODA Area 2 were all below 1.0.
- The HQs for exposure to barium ranged from 6 for the pygmy rabbit (M122A), 20 for the deer mouse (M422), to 70 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 221 mg/kg decreasing to 156 mg/kg in the subsurface soil. The INEEL background concentration for barium is 300 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. All species except for the deer mouse have HQs that fall below the low risk HQ of 10. The deer mouse was modeled with conservative BAFs (1.0) and it is not anticipated that this exposure will occur. The use of more realistic BAFs would likely reduce the HQs for this receptor. For this reason, it would be unlikely for barium to pose significant risk to this mammalian receptor, and it will no longer be evaluated as a COPC.
- Benzo(g,h,i)perylene HQs at NODA Area 2 were all below 1.0. TRV values from benzo(a)pyrene were used to evaluate this COPC because of their similar characteristics and properties. TRV values for benzo(g,h,i)perylene could not be developed because of the lack of toxicity data.
- The HQs for exposure to cadmium ranged from 10 for the sage sparrow (AV222) and black-billed magpie (AV422), 20 for the loggerhead shrike (AV322), 30 for the mule deer (M122), 100 for the pygmy rabbit (M122A), 400 for the deer mouse (M422), to 500 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 1.8 mg/kg decreasing to 1.25 mg/kg in the subsurface soil. The INEEL background concentration for cadmium is 2.2 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. The EPC for this contaminant represents an overly conservative value due to exposure modeling using weighed averages, and therefore would not be likely to pose a significant risk to any of these ecological receptors. This COPC can be eliminated from further evaluation.
- The only HQ ≥ 1 for exposure to chromium was a 5 for plants (all vegetation). The EPC in the surface soil is 23.4 mg/kg increasing to 27.2 mg/kg in the subsurface soil. The INEEL background concentration for chromium is 33 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to cobalt ranged from 1 for the burrowing owl (AV322A), mule deer (M122), and Townsend's western big-eared bat (M210A), 4 for the deer mouse (M422); 5 for the loggerhead shrike (AV322), 6 for the sage sparrow (AV222), 7 for the pygmy rabbit (M122A), 20 for the black-billed magpie (AV422), to 50 for the mourning dove (AV122). The EPC in the surface soil is 8.9 mg/kg decreasing to 7.1 mg/kg in the subsurface soil. The INEEL background concentration for cobalt is 12.5 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. The EPC for this contaminant represents an overly conservative value due to exposure modeling

using weighed averages and, therefore, would not be likely to pose a significant risk to any of these ecological receptors. This COPC can be eliminated from further evaluation.

- The HQs for exposure to copper ranged from 1 for the black-billed magpie (AV422); 2 for the mourning dove (AV122), mule deer (M122), and the sage sparrow (AV222); 10 for the pygmy rabbit (M122A); 20 for the deer mouse (M422); and 30 for the Townsend's western big-eared bat (M210A). The EPC in the surface soil is 0.79 mg/kg decreasing to 54 mg/kg in the subsurface soil. The INEEL background concentration for copper is 22 mg/kg. This contaminant is above the low risk HQ of 10 for two mammalian species. Four sample results for copper were removed from the data set before the EPCs were calculated. These samples were removed because they were representative of "hot spots." These four sample results have concentrations ranging from 24,000 to 772 mg/kg. Several other sample results showed levels above background, but they were significantly less in concentration. Therefore, risk from exposure to copper contamination at NODA Area 2 is not considered hazardous to ecological receptors. This COPCs will no longer be retained or evaluated in the FS. However, because there is some potential for risk from exposure to copper this COPC will be retained for further evaluation in the INEEL-wide ERA (Section 17).
- HMX HQs at NODA Study Area 2 were all below 1.0.
- The HQs for exposure to lead ranged from 1 for the burrowing owl (AV322A), 2 for the black-billed magpie (AV422), 4 for the sage sparrow (AV222), to 5 for the loggerhead shrike (AV322). The EPC in the surface soil is 36.3 mg/kg decreasing to 25.7 mg/kg in the subsurface soil. The INEEL background concentration for lead is 17 mg/kg. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to manganese ranged from 2 for the black-billed magpie (AV422) and mule deer (M122), 6 for the mourning dove (AV122) and deer mouse (M422), 7 for plants (all vegetation), to 10 for the pygmy rabbit (M122A). The EPC in the surface soil is 350 mg/kg decreasing to 259 mg/kg in the subsurface soil. The INEEL background concentration for manganese is 490 mg/kg. Therefore, a receptor may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to mercury ranged from 1 for the deer mouse (M422), Townsend's western big-eared bat (M210A) and pygmy rabbit (M122A); 2 for the burrowing owl (AV322A); 7 for the sage sparrow (AV222); to 8 for the mourning dove (AV122), loggerhead shrike (AV322), and black-billed magpie (AV422). The EPC in the surface soil is 0.30 mg/kg decreasing to 0.27 mg/kg in the subsurface soil. The INEEL background concentration for mercury is 0.05 mg/kg. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Nickel HQs at NODA Area 2 were all below 1.0.
- The HQs for exposure to nitrate ranged from 1 for the pygmy rabbit (M122A), deer mouse (M422), and black-billed magpie (AV422); 2 for the mourning dove (AV122), loggerhead shrike (AV322), and Townsend's western big-eared bat (M210A); to 3 for the sage sparrow (AV222). The EPC in the surface soil is 98.3 mg/kg increasing to 164 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made

available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.

- The HQs for exposure to nitrite were 1 for the mourning dove (AV122), sage sparrow (AV222), loggerhead shrike (AV322), and Townsend's western big-eared bat (M210A). TRV values from nitrate were used to evaluate this COPC because of their similar characteristics and properties. TRV values for nitrite could not be developed because of the lack of toxicity data.
- The HQs for exposure to pentachlorophenol ranged from 1 for the deer mouse (M422) to 3 for the pygmy rabbit (M122A). The EPC in the surface soil is 1 mg/kg decreasing to 0.94 mg/kg in the subsurface soil. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to RDX ranged from 3 for the Townsend's western big-eared bat (M210A), 700 for the mule deer (M122), 2,000 for the deer mouse (M422), to 4,000 for the pygmy rabbit (M122A). The EPC in the surface soil is 328 mg/kg decreasing to 131 mg/kg in the subsurface soil. This contaminant is well above the low risk HQ of 10.
- Silver HQs at NODA Area 2 were all below 1.0.
- The HQs for exposure to strontium ranged from 2 for the deer mouse (M422) to 4 for the pygmy rabbit (M122A). The EPC in the surface soil is 64.4 mg/kg decreasing to 57.7 mg/kg in the subsurface soil. The INEEL background value for nitrate has not been evaluated or made available at this time. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- Tetryl HQs at NODA Area 2 were all below 1.0.
- The HQs for exposure to vanadium ranged from 1 for the sage sparrow (AV222), 3 for the deer mouse (M422), to 10 for the Townsend's big-eared bat (M210A). The EPC in the surface soil is 36.3 mg/kg decreasing to 25.7 mg/kg in the subsurface soil. The INEEL UTL background concentration for vanadium is 45 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to zinc ranged from 2 for the burrowing owl (AV322A), deer mouse (M422), and pygmy rabbit (M122A); 3 for the Townsend's western big-eared bat (M210A); 5 for plants (all vegetation); 7 for the black-billed magpie (AV422); to 10 for the mourning dove (AV122) and sage sparrow (AV 222). The EPC in the surface soil is 166 mg/kg decreasing to 119 mg/kg in the subsurface soil. The INEEL background concentration for zinc is 150 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 2 at NODA has risk to ecological receptors from exposure to copper and RDX.

Area 3

HQs for the COPCs from this area ranged from 1 to 90. Risks to birds could not be assessed for threats from exposure to barium. Risk for plants could not be assessed for cobalt. 2-hexanone and 2-pentanone were among the COPCs, but no toxicity information could be found to assess ecological risk. The concentration of these compounds were found at very low levels: 0.013 mg/kg for 2-hexanone and 48.6 mg/kg for 2-pentanone. For this reason, they are unlikely to pose significant risk to any ecological receptor and will no longer be evaluated.

The HQs for the COPCs at NODA Area 3 are discussed below:

- The HQs for exposure to barium ranged from 1 for the mule deer (M122) to 7 for the pygmy rabbit (M122A) to 30 for the deer mouse (M422) to 90 for the Townsend's western big-eared bat (M210A). The exposure point concentration in the surface soil is 298 mg/kg, decreasing to 132 mg/kg in the subsurface soil. The INEEL background concentration for barium is 300 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. All species except for the deer mouse and Townsend's western big-eared bat have HQs that fall below the low risk HQ of 10. These two species were modeled with conservative BAF (1.0), and it is not anticipated that this exposure will occur. The use of more realistic BAFs would likely reduce the HQs for these receptors. For this reason, it would be unlikely for barium to pose significant risk to these mammalian receptors, and it will no longer be evaluated as a COPC.

Table 12-48. Summary of ERA HQs for NODA Area 3.

COPCs Receptors	Barium HQs	Chromium HQs	Cobalt HQs	Copper HQs	Lead HQs	Manganese HQs	Vanadium HQs	Zinc HQs
Black-billed magpie	—	—	20 ^a	—	—	2	—	7
Burrowing owl	—	—	1	—	—	—	—	2
Deer mouse	30 ^a	—	5	5	—	8	3	2
Loggerhead shrike	—	—	6	—	2	—	—	6
Mourning dove	—	—	70 ^a	—	—	8	—	10
Mule deer	1	—	2	—	—	3	—	—
Plants	—	5	—	—	—	9	—	5
Pygmy rabbit	7	—	10	3	—	20 ^a	—	2
Sage sparrow	—	—	8	—	2	—	—	10
Townsend's western big-eared bat	90 ^a	—	2	8	—	—	10	2

COPCs with HQs less than one are not presented in this table.

a. See the bulleted discussion on barium, cobalt, and manganese following this table as to why these HQ are not retained in the ERA.

- The only HQ greater than 1 for exposure to chromium was a 5 for plants (all vegetation). The exposure point concentration in the surface soil is 23.7 mg/kg, decreasing to 22.7 mg/kg in the subsurface soil. The INEEL background concentration for chromium is 33 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to cobalt ranged from 1 for the burrowing owl (AV322A) to 2 for the mule deer (M122) and Townsend's western big-eared bat (M210A) to 5 for the deer mouse (M422) to 6 for the loggerhead shrike (AV322) to 8 for the sage sparrow (AV222) to 10 for the pygmy rabbit (M122A) to 20 for the black-billed magpie (AV422) to 70 for the mourning dove (AV122). The exposure point concentration in the surface soil is 11.4 mg/kg, decreasing to 8.2 mg/kg in the subsurface soil. The INEEL background concentration for cobalt is 11 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. These species were modeled with conservative BAFs (1.0), and it is not anticipated that this exposure will occur. The use of more realistic BAFs would likely reduce the HQs for these receptors. For this reason, it would be unlikely for cobalt to pose significant risk to these receptors, and it will no longer be evaluated as a COPC.
- The HQs for exposure to copper ranged from 3 for the pygmy rabbit (M122A) to 5 for the deer mouse (M422) to 8 for the Townsend's western big-eared bat (M210A). The exposure point concentration in the surface soil is 24.5 mg/kg, decreasing to 17.2 mg/kg in the subsurface soil. The INEEL background concentration for copper is 22 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The only HQ greater than 1 for exposure to lead was 2 for the sage sparrow (AV222) and loggerhead shrike (AV322). The exposure point concentration in the surface soil is 17.8 mg/kg, decreasing to 14.5 mg/kg in the subsurface soil. The INEEL background concentration for lead is 17 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. This contaminant was eliminated as a COPC because the HQs fell below 10, which indicates a low risk to ecological receptors.
- The HQs for exposure to manganese ranged from 2 for the black-billed magpie (AV322) to 3 for the mule deer (M122) to 8 for the deer mouse (M422) and mourning dove (AV122) to 9 for plants (all vegetation) to 20 for the pygmy rabbit (M122A). The exposure point concentration in the surface soil is 453 mg/kg, decreasing to 241 mg/kg in the subsurface soil. The INEEL background concentration for manganese is 490 mg/kg. Therefore, an average species may be exposed to the same magnitude of risk from exposure to background. The exposure point concentration for this contaminant represents an overly conservative value due to exposure modeling using weighed averages. Therefore, it would not be likely to pose a significant risk to any of these ecological receptors. This COPC can be eliminated from further evaluation.
- Nickel HQs at NODA Area 3 were all below 1.0.
- The HQs for exposure to vanadium ranged from 3 for the deer mouse (M422) to 10 for the Townsend's western big-eared bat (M210A). The exposure point concentration in the surface soil is 24.4 mg/kg, decreasing to 18.2 mg/kg in the subsurface soil. The INEEL

background concentration for vanadium is 45 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.

- The HQs for exposure to zinc ranged from 2 for the Townsend's western big-eared bat (M210A), burrowing owl (AV322A), pygmy rabbit (M122A), and deer mouse (M422) to 5 for plants (all vegetation) to 6 for the loggerhead shrike (AV322) to 7 for the black-billed magpie (AV422) to 10 for the mourning dove (AV122) and sage sparrow (AV222). The exposure point concentration in the surface soil is 159 mg/kg, decreasing to 89.1 mg/kg in the subsurface soil. The INEEL background concentration for zinc is 150 mg/kg. This contaminant was eliminated as a COPC because the HQs were equal to or below 10, which indicates a low risk to ecological receptors.

The risk evaluation indicates that Area 3 at NODA has limited risk to ecological receptors from exposure to soil from this site. No COPCs were retained for further evaluation in the ERA for NODA Area 3.

Area 4

HQs for the COPCs from this area ranged from 1 to 80. Risks to birds and plants could not be assessed for threats from exposure to TPH. Methapyriline was among the COPCs, but no toxicity information could be found to assess ecological risk. The concentration of this compounds was found at very low levels; 1.7 mg/kg. For this reason, it is unlikely to pose significant risk to any ecological receptor and will not longer be evaluated.

The HQs for the COPCs at NODA Area 4 are discussed below:

- The HQs for exposure to manganese ranged from 10 for the deer mouse (M422) and plants (all vegetation) to 20 for the pygmy rabbit (M122A). The exposure point concentration in the surface soil is 555 mg/kg, decreasing to 222 mg/kg in the subsurface soil. The INEEL 95% UTL background concentration for manganese is 490 mg/kg. The exposure point concentration for this contaminant represents an overly conservative value due to exposure modeling using weighed averages. Therefore, it would not be likely to pose a significant risk to any of these ecological receptors. This COPC can be eliminated from further evaluation.
- Selenium HQs at NODA Area 4 were all below 1.0.

Table 12-49. Summary of ERA HQs for NODA Area 4.

COPCs Receptors	Manganese HQs	TPH-diesel HQs
Deer mouse	10 ^a	40
Plants	10 ^a	—
<u>Pygmy rabbit</u>	20 ^a	80

COPCs with HQs less than one are not presented in this table.

a. See the bulleted discussion on manganese following this table as to why this HQ is not retained in the ERA.

- The HQs for the exposure to TPH-diesel ranged from 40 for the deer mouse (M422) to 80 for the pygmy rabbit (M122A). The exposure point concentration in the surface soil is 1,200 mg/kg, decreasing to 204 mg/kg in the subsurface soil. Toxicity reference values from benzene were used to evaluate this contaminant because benzene is the most hazardous chemical found in TPH-diesel. This was done because toxicity reference values for TPH-diesel could not be developed owing to lack of toxicity data. The HQs for this contaminant are well above the low risk HQ of 10.

The risk evaluation indicates that Area 4 at NODA has risk to ecological receptors from exposure to TPH-diesel.

In summary, based on dose and HQ calculations and background comparisons, the primary potential risk-drivers at NODA include copper and RDX (at Area 2), and TPH-diesel (at Area 4) in soil. The risk from UXO to ecological receptors is considered low. Complete ERA results are presented in Appendix F.

12.5 Uncertainties

Insufficient toxicological data exist for 4-chloro-3-methylphenol. Therefore, the potential human health risks posed by this COPC could not be evaluated. The lack of toxicity data also hindered development of toxicity reference values (TRVs) for ecological receptors such as; invertebrates, reptiles, amphibians, and a few birds. Ecological risks to these receptors were not evaluated in this ERA. Furthermore, TRVs could not be developed for a few COPCs and risk from these contaminants were not evaluated. These COPCs include 2-hexanone, 2-pentanone, 4-nitrophenol, bromomethane, chlorobenzene, methapyrilene, picric acid, and trichlorofluoromethane. The uncertainties associated with the lack of TRVs in the ERA could result in underestimation of risk to ecological receptors.

Several gasoline products were screened during the initial screening of HHRA and ERA at NODA; however, owing to the lack of toxicity data these contaminants may pose some uncertainty in the risk analysis and underestimate risk. These include 2,3,7-trimethyloctane, 3,4-dimethyldecane, 4,6-dimethylundecane, gasoline range C7-C12 Idaho, and heneicosane 11-(lethylprop).

The dermal absorption pathway used in the human health risk assessment is limited because it is not recommended to use assumed or default dermal absorption values for volatile or inorganic contaminants (EPA 1999). Not evaluating dermal risks for volatile or inorganic contaminants could cause further uncertainty in the risk assessment and may result in underestimation of cancer risks. Owing to the lack of toxicity data, RfDs were not found for benzo(a)pyrene and phenanthrene at Fire Station Area 3; for benzo(g,h,i)perylene and 2-pentanone at NODA Area 2; for 2-pentanone at NODA Area 3; and for benzo(a)pyrene and TPH-diesel at NODA Area 4. These human health COPCs could be evaluated for neither noncarcinogenic risk nor the dermal absorption pathway for all scenarios.

A sensitivity study was conducted on the human health COPCs to see which contaminants would screen on an additional HHRA screen at 1/10th of the RBCs. This study was also conducted to identify any additional contaminants to be evaluated in the HHRA. The results of this additional HHRA screen can be found in Appendix C, in the individual sites screening tables. NODA (Area 2) was the only area identified as having additional COPCs to be retained for the HHRA. These COPCs include 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, aluminum, barium, benzene, cadmium, chromium, manganese, mercury, nickel, pentachlorophenol, and vanadium. Any additional risk presented by these contaminants has not yet been quantified; however, Area 2 has already been brought forward into the feasibility study for possible remediation. Hopefully, the decided treatment method will encompass these COPCs and reduce current risks. These 12 contaminants will be added to any postremedial sampling.

To limit the amount of information having to be repeated in each site or areas uncertainty section, only the specific uncertainties associated with the sites/areas are discussed within each uncertainty section. For more general or overall uncertainties associated with the HHRA please, see the uncertainty section in Appendix D. Uncertainties associated with the ERA can be found in Appendix F.

Toxicity profile and fate and transport write-ups were written for a few of the HHRA and ERA COPS so that they could be evaluated more qualitatively (profiles can be found in Appendix D, Attachments D1 and D2).

12.6 Conclusions and Recommendations

All retained sites for the HHRA are presented in Table 12-50, with the human health risks for the future resident, current worker, and future worker scenarios.

Table 12-50. Summary index of cumulative human health carcinogenic risks and noncarcinogenic hazards for all retained sites or areas.

Area	Cancer Risk Scenario			Hazard Index Scenario		
	Residential	Current Worker	Future Worker	Residential	Current Worker	Future Worker
Experimental Field Station Area 1	9E-05	6E-05	6E-05	1E+01	1E+00	1E+00
Fire Station Area 1	1E-05	3E-06	3E-06	1E+00	6E-02	6E-02
Fire Station Area 2	6E-06	7E-07	7E-07	9E-01	1E-02	1E-02
Fire Station Area 3	4E-05	1E-05	1E-05	6E-01	8E-05	8E-05
Fire Station Area 4	8E-05	7E-06	7E-06	9E+00	1E-01	1E-01
Land Mine Fuze Burn Area 3	6E-03	4E-03	4E-03	7E+02	7E+01	7E+01
NOAA Area 2	4E-05	2E-08	2E-08	6E+00	3E-04	3E-04
NOAA Area 2a	1E-04	5E-05	8E-05	2E+01	9E-01	9E-01
NOAA Area 3	8E-05	2E-05	2E-05	1E+01	4E-01	4E-01
NOAA Area 5	1E-03	1E-04	1E-04	1E+02	2E+00	2E+00
NOAA Area 6	4E-04	3E-05	3E-05	4E+01	6E-01	6E-01
NODA Area 2	2E-02	1E-05	1E-05	2E+02	1E-01	1E-01

Source: HHRA Spreadsheets. See Appendix E.

4-chloro-3-methylphenol was not evaluated with the other human health COPSs owing to the lack of toxicity data to develop risk base values. A toxicity profile has been developed to help evaluate this contaminant more qualitatively (see Appendix D, Attachments D1 and D2). Toxicity profiles are also available for 2-pentanone, methapyriline, and TPH-diesel.

Table 12-51 summarizes all sites or areas retained in the ERA. It presents the ecological receptors that showed risk (HQs greater than 10) and the highest hazard quotient determined at each site or area retained. The table also includes all ecological receptors showing risk and COPCs not evaluated in the ERA because of the lack of toxicity information to determine toxicity reference values.

Table 12-51. Summary of all retained COPCs and sites in the ERA.

Site	Ecological receptors at Risk	HQs	COPC
Experimental Field Station	Deer mouse and pygmy rabbit	≤ 1 to ≤ 80	1,3-Dinitrobenzene
	Deer mouse and pygmy rabbit	≤ 1 to ≤ 300	2,4,6-Trinitrotoluene
Fire Station II Zone and Range Fire Burn Area	Deer mouse and pygmy rabbit	≤ 1 to ≤ 40	2,4,6-Trinitrotoluene
	Deer mouse and pygmy rabbit	≤ 1 to ≤ 40	RDX
Land Mine and Fuze Burn Area ^a	Deer mouse and pygmy rabbit	≤ 1 to ≤ 10,000	2,4,6-Trinitrotoluene
National Oceanic and Atmospheric Administration Grid	Deer mouse and pygmy rabbit	≤ 1 to ≤ 200	1,3-Dinitrobenzene
	Deer mouse and pygmy rabbit	≤ 1 to ≤ 500	2,4,6-Trinitrotoluene
	Pygmy rabbit	≤ 1 to ≤ 20	RDX
Naval Ordnance Disposal Area 2	Deer mouse, mule deer, and pygmy rabbit	≤ 1 to ≤ 4000	RDX
		≤ 1 to ≤ 30	Copper ^b
Area 4		≤ 1 to ≤ 80	TPH-Diesel ^c
Security Training Facility Gun Range Berm STF-02	Black-billed magpie, burrowing owl, deer mouse, loggerhead shrike, mourning dove, pygmy rabbit, sage sparrow, and Townsend's western big-eared bat	≤ 1 to ≤ 2000	Lead

Source: ERA Spreadsheets. See Appendix G.

a. 1,3-dinitrobenzene and 2,4-dinitrotoluene were not assessed as contaminants at the Land Mine and Fuze Burn Area because of uncertainties associated with the laboratory analysis. The exposure point concentrations used in the ERA were based on sample results that the laboratory flagged as a nondetect. There were significant issues with laboratory methods and the sample matrix that resulted in extremely high detection limits. These uncertainties limit the ability to determine risk to ecological receptors. However, the Land Mine and Fuze Burn Area is currently being evaluated for remediation from 2,4,6-TNT contamination, and presumably 1,3-dinitrobenzene and 2,4-dinitrotoluene would also be treated or removed as part of that remediation action. Postremedial sampling for the Land Mine and Fuze Burn Area would also include analyzing for 1,3-dinitrobenzene and 2,4-dinitrotoluene to determine if any residual contamination is left behind. These COPCs are also being retained for the OU 10-04 ERA (see Section 17).

b. Four sample results for copper were removed from the data set before the EPCs were calculated. These samples were removed because they were representative of "hot spots." These four sample results have concentrations ranging from 24,000 to 772 mg/kg. Several other sample results showed levels above background, but they were significantly less in concentration. Therefore, risk from exposure to copper contamination at NODA Area 2 is not considered hazardous to ecological receptors. This COPC will no longer be retained or evaluated in the FS. However, because there is some potential for risk from exposure to copper this COPC will be retained for further evaluation in the OU 10-04 ERA (Section 17).

c. Only two ecological receptors show risk from TPH-diesel with HQs above 10: the deer mouse and the pygmy rabbit. TPH-diesel is the only COPC at this site that presents any potential for risk. This contaminant is unlikely to pose an unacceptable risk to ecological receptors, because of the conservativeness in the ERA, and should not be considered a COC at this site. TPH-diesel will no longer be evaluated in this ERA. A toxicity profile was developed for TPH-diesel to analyze this contaminant more qualitatively (see Appendix D, Attachment D1). However, because there is still some potential for risk, this COPC will be retained and evaluated in the OU 10-04 ERA (Section 17).

2-hexanone, 2-pentanone, 2-amino-2,4-dinitrotoluene, 4-amino-2,6-dinitrotoluene, 4-nitrophenol, bromomethane, chlorobenzene, methapyrilene, picric acid, and trichlorofluoromethane were not evaluated with the other ecological COPCs because of the lack of toxicity data to develop risk-based values. Toxicity profiles have been developed for 2-amino-2,4-dinitrotoluene, 2-pentanone, 4-amino-2,6-dinitrotoluene, and methapyrilene (see Appendix D, Attachment D1); however, risk to ecological receptors from the other COPCs mentioned are unknown. Many of these contaminants were detected at low concentrations, and the detection frequencies were also very low, making these contaminants unlikely to pose a significant risk to ecological receptors.

The following sites with TNT and RDX soil contamination will be retained for further evaluation in the feasibility study:

- Experimental Field Station
- NODA
- Land Mine and Fuze Burn Area
- NOAA Grid
- Fire Station II Zone and Range Fire Burn Area.

The following areas with confirmed UXO will be retained for evaluation in the feasibility study:

- NODA
- Mass Detonation Area
- Rail Car Explosion Area
- Land Mine and Fuze Burn Area.

In addition, the following areas will be retained for evaluation of possible subsurface UXO in the feasibility study:

- Naval Proving Ground
- Arco High Altitude Bombing Range
- Twin Buttes Bombing Range.

Assessment of potential subsurface UXO for the Naval Proving Ground will include those areas within the original boundary of the Naval Proving Ground, as shown in Figure 1 from Sherwood et al. (1998). These include the following:

- CFA-633 Naval Firing Range and Downrange Area
- CFA Gravel Pit
- CFA Sanitary Landfill Area
- Explosives Storage Bunkers North of INTEC
- NOAA Grid
- Fire Station II Zone and Range Fire Burn Area
- Anaconda Power Line
- Old Military Structures

- Dairy Farm Revetments
- Experimental Field Station
- Unexploded Ordnance East of TRA
- Burn Ring South of Experimental Field Station
- Igloo-type Structures Northwest of Experimental Field Station
- Unexploded Projectiles East of ARVFS
- Projectiles Found Near Mile Markers 17, 18, and 19
- Zone East of the Big Lost River
- Dirt Mounds Near Experimental Field Station
- Craters East of INTEC.

The area referred to in the OU 10-04 Work Plan as the Firing Range will be dropped from further consideration, because the area is not located within any known areas where ordnance was used on the INEEL. No evidence can be found to support that the area exists. The “Ordnance and Dry Explosives East of the Big Lost River and North of NRF” area will be evaluated as part of the Rail Car Explosion Area.

12.7 References

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